



### TQF.3 Course Specification

#### Section 1 General Information

##### 1. Course Code and Title

In Thai	วทชพ 282	ปฏิบัติการชีวเคมี
In English	SCBM 282	Laboratory in Biochemistry

##### 2. Number of Credits 1 (0-2-1).

##### 3. Curriculum and Course Type

3.1 Program of Study	Biomedical Science International Program
3.2 Course Type	Compulsory

##### 4. Course Coordinator and Instructor

4.1 Course Instructor	Prof. Dr. Sarawut Jitrapakdee Department of Biochemistry Faculty of Science Mahidol University Tel 02-2015458 email sarawut.jit@mahidol.ac.th
4.2 Instructor	Instructors in the Department of Biochemistry

##### 5. Semester/Class Level

5.1 Semester 1/ Class Level 2
5.2 Number of Students Allowed Approximately 114 Students

##### 6. Pre-requisite

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##### 7. Co-requisites

SCBM 281.



## 8. Study Site Location

Faculty of Science at Salaya campus

## 9. Date of Preparation/Latest Revision of the Course Specifications

4 August Year 2023

### Section 2 Aims and Objectives

#### 1. Course Goals

When the course is finished students should be able to

- 1.1 Use basic practical skills to test structure function and relation of biomolecules
- 1.2 Understand knowledge and direction to analyze experimental results
- 1.3 Work in group in the topics of system biology and medical applications
- 1.4 Search and use data from various sources for data analysis and problem solving

#### 2. Objectives of Course Development / Revision

2.1 Revise sequences and contents of teaching to be more suitable for development and group of students.

2.2 Course-level Learning Outcomes (CLOs)

Bring knowledge about biomolecules and mechanism to be analyzed and linked to knowledge development and understanding of the subject and related topics

### Section 3 Course Description and Implementation

#### 1. Course Description

การทดสอบคุณสมบัติทางเคมีของโปรตีน การวัดการทำงานของเอนไซม์ LDH โดยวิธี spectrophotometry การสกัด DNA และเพิ่มปริมาณด้วย PCR และวิเคราะห์ด้วยวิธี gel electrophoresis เทคนิคและการประยุกต์การใช้เทคโนโลยีด้าน DNA

Chemical property of protein, Determination of LDH enzyme activity by spectrophotometric method, Determination of liver enzyme activities, DNA isolation and PCR amplification followed with analysis of DNA by gel electrophoresis technique, DNA technologies and applications

**2. Number of hours per semester**

<b>Theory</b> (hours)	<b>Practice</b> (hours)	<b>Self-study</b> (hours)
0	16	2

**3. Number of Hours per Week for Individual Advice**

We have Q&A sessions for students both before and after classes via social media and email and also personal talk in practical sessions. In addition with Q&A and Kahoot game for pre-examination reviews.

In practical sessions, student s able to ask instructors and instructors explain answer and advices in related topics.

After the classes are finished, we have Q&A sessions to answer and advice students after they have revises their lessons.



#### Section 4: Development of the expected learning outcomes

#### 1. A brief summary of the knowledge or skills expected to develop in students; the course-level expected learning outcomes (CLOs)

By the end of the course, students who successfully complete the course will be able to:

- CLO1 Have skill and understand good laboratory practice in Biochemistry
- CLO2 Describe chemical properties of protein and able to use appropriate reagents to test peptide and protein
- CLO3 Determine lactate dehydrogenase activity and understand kinetic parameters
- CLO4 Determine anaerobic and aerobic metabolism of yeast
- CLO5 Understand principle of plasmid DNA isolation, PCR and agarose gel electrophoresis
- CLO6 Understand principle of DNA technologies and application in biochemical research
- CLO7 Work as a team and develop presentation skill in biochemistry
- CLO8 Develop leadership and interpersonal interaction and engagement.

#### 2. How to organize learning experiences to develop the knowledge or skills stated in number 1 and how to measure the learning outcomes

Course Code	Teaching and learning experience management	Learning outcomes measurements
CLO1	VDO	Quiz
CLO2	Pre-lab instructions, Practical Lab	report, attendance, written exam
CLO3	Pre-lab instructions, Practical Lab	report, attendance, written exam
CLO4	Pre-lab instructions, Practical Lab	report, attendance, written exam
CLO5	Pre-lab instructions, Practical Lab	report, attendance, written exam
CLO6	VDO	In class exercise, attendance, written exam
CLO7	In class activity	In class exercise, attendance, written exam



SECTION 5 LESSON PLAN AND EVALUATION

1. Lesson Plan

Day	Date	Time	Activity	Room	Instructor
Monday	21 Aug. 23	13:30-15:30	Basic biochemistry technique & safety	SC1-152	NP
Tuesday	22 Aug. 23	13.00-16.00	(Lab test) ทดสอบปฏิบัติการ Lab 1 : Chemical pr	K311	OS, 6TAs
Monday	28 Aug. 23	13.30-14.30	Pre-lab 1 : Instructions	SC1-152	WK, 6TAs
		14:30-16:30	Lab 1 : Chemical properties of protein	SC3-300	Wk, 3TAs
		14:30-16:30	Lab 1 : Chemical properties of protein	SC3-400	NP, 3TAs
Tuesday	29 Aug. 23	13.00-16.00	(Lab test) ทดสอบปฏิบัติการ Lab 2 : LDH enzyme and kinetics	K311	OS, 6TAs
Monday	4 Sep. 23	13.30-14.30	Pre-lab 2 : Instructions	SC1-152	JY, 6TAs
		14:30-16:30	Lab 2 : LDH enzyme and kinetics	SC3-300	JY, 3TAs
		14:30-16:30	Lab 2 : LDH enzyme and kinetics	SC3-400	SK, 3TAs
Monday	11 Sep. 23	13:30-15:30	Lab discussion (Lab 1, 2)	SC1-152	WK, JY
<b>Midterm Examination 2023</b>					
Tuesday	10 Oct. 23	13.00-16.00	(Lab test) ทดสอบปฏิบัติการ Lab 3 : Yeast metab	K311	OS, 6TAs
Monday	16 Oct. 23	13:30-14:30	Pre-lab 3 : Instructions	SC1-152	JM, 6TAs
		14:30-16:30	Lab 3 : Yeast metabolism	SC3-300	JM, 3TAs
		14:30-16:30	Lab 3 : Yeast metabolism	SC3-400	SC, 3TAs
Monday	30 Oct. 23	13:30-15:30	CAI	SC1-152	LJ, 2TAs
Tuesday	7 Nov. 23	13.00-16.00	(Lab test) ทดสอบปฏิบัติการ Lab 4 : Plasmid DNA isolation and electrophoresis	K311	OS, 6TAs
Monday	13 Nov. 23	13:30-14:30	Pre-lab 4 : Instructions	SC1-152	LJ, 6TAs
		14:30-16:30	Lab 4 : Plasmid DNA isolation and electrophoresis	SC3-300	LJ, 3TAs
		14:30-16:30	Lab 4 : Plasmid DNA isolation and electrophoresis	SC3-400	MK, 3TAs
Monday	20 Nov. 23	13:30-15:30	Lab discussion (Lab 3, 4)	SC1-152	JM, LJ
Monday	27 Nov. 23	13:30-15:30	TBL	SC1-152	LJ, 2TAs
<b>Final Examination 2023 (Lecture 18-34)</b>					

2. Evaluation of the CLOs

2.1 Measurement and Evaluation of learning achievement

a. Formative assessment

It is just an evaluation for student development and improvement. This evaluation will not be included in the personal performant score. We evaluate by explain the solution of homework and quiz and describe answers.

b. Summative assessment

(1) Tool and weight for measurement and evaluation

Learning Outcomes	Lab report	Pre-lab quiz/ Exercise	Written exam	Group engagement	Weight
	CLO1	0	0	0	0
CLO2	10	2.5	5	2.5	20
CLO3	10	2.5	5	2.5	20
CLO4	10	2.5	5	2.5	20
CLO5	10	2.5	5	2.5	20
CLO6	0	10	0	0	10
CLO7	0	10	0	0	10
<b>Total</b>	<b>40</b>	<b>30</b>	<b>20</b>	<b>10</b>	<b>100</b>



(2) Measurement and evaluation

Grading (A, B+, B, C+, C, D+, D, F) will be determined by group statistics first then by given score ranges according to the previous years statistics. Passing score  $\geq 50\%$

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(3) Re-examination (if the course allows any)

No reexam in this course. Students who receive F need to register for the next year.

### 3. Students' Appeal

Students can announce appeal to the course at course coordinator. The course coordinator will manage and report or consult to the SIM program committee.

## Section 6 Teaching Resources

### 1. Required Texts

- 1) Ferrier, R.,D., Lippincott's Illustrated Reviews Biochemistry, 6<sup>th</sup> edition, Lippincott Williams & Wilkins (ASP)
- 2) Lehninger, L. A., Nelson, D. L., and Cox, M. M., *Principles of Biochemistry*, 4<sup>th</sup> or 5<sup>th</sup> edition, Worth, New York

### 2. Suggested Materials

Teaching materials as given in advance

### 3. Other Resources (if any)

Google Classroom Pubmed, Youtube, book websites

## Section 7 Evaluation and Improvement of Course Implementation

### 1. Strategy for Course Effectiveness Evaluation by Students

Faculty of Science has online evaluation platform for students after the course ended. Observation of student behavior and complains and feedbacks from course coordinator, teaching staffs and students

### 2. Strategy for Teaching Evaluation

From study group performance and from observation by third party



### **3. Teaching Improvement**

After the course ended, we will arrange staff meeting for post evaluation and finding the plan to improve teaching strategy next year.

### **4. Verification of Standard of Learning Outcome for the Course**

During teaching, we will evaluate achievement in each topic, expectation from student feedbacks, random-checking individual student works, making an evaluation form in necessity topics and student score statistic by overall and each topic.

### **5. Revision Process and Improvement Plan for Course Effectiveness**

5.1 Revise lesson plan and curriculum every 3 years or as major suggestions.

5.2 Change or swap or add teaching staffs to increase new information and staff experiences to widen student experiences.



Appendix

Relations between the course and the program

**Table 1** Relations between the course and the PLOs

Course Name Medical Biochemistry	PLOs						
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
(Course Code) SCBM 225							

**Remarks :** Show the level of the course management with the symbols I, R, P, and M. This must correspond to the curriculum mapping written in the TQF2.

**Table 2** Relations between CLOs and PLOs

(Course Code) SCBM 224	PLOs						
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
CLO1 .....	1.1			4.2	5.2		
CLO2 .....	1.1			4.2	5.2		
CLO3 .....	1.1			4.2	5.2		
CLO4 .....	1.1			4.2	5.2		
CLO5	1.1			4.2	5.2		
CLO6	1.1			4.2	5.2		
CLO7	1.1			4.2	5.2		

**Remarks:**

- a. Each CLO should clearly correspond to the PLO at the SubPLO level to show a clear connection.
- b. Describe the PLOs and SubPlos only referred to in the course in “[Table 3](#) PLOs that the course is responsible for”.

**Table 3** PLOs that the course is responsible for

PLOs	SubPLOs
PLO1 .....	1.1 .....
	1.3 .....
	1.4 .....
PLO3 .....	3.4 .....
PLO4 .....	4.2 .....
PLO7 .....	7.2 .....



Program Biomedical Science International Program



Degree Bsc..

Course Title . Medical Biochemistry Laboratory

Faculty/College..Science

Course Code .SCBM 225/282.....

Department Biochemistry

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